17th Symposium on Earthquake Engineering
November 14-17, 2022
IIT Roorkee, India
Paper No. 248

Seismic Evaluation of Assam Type Building Using Abaqus®

Parikhyana Boruah[1], Atanu Kumar Dutta[2]

[1]Graduate Student, Dept. of Civil Engineering, Jorhat Engineering College
[2]Professor, Dept. of Civil Engineering Jorhat Institute of Science and Technology, Jorhat

Abstract

Assam-type housing is a building typology that was promoted by the British PWD after the 1897 Assam Earthquake, in which a light-weight construction was made possible by suitable use of locally accessible resources such as timber, bamboo, ikra (a reed which is locally accessible), etc. for the superstructure, while modern masonry confined with RCC posts were used till sill level. This low-cost, green and sustainable housing typology is slowly replaced by costly, environmentally degrading, unsustainable RCC frame structures.

In this study, an attempt is made to promote this green, cost-effective and safe housing typology by showing its efficacy analytically against seismic excitation using appropriate finite element modeling. Modeling is done using state-of-the-art Finite Element Analysis software ABAQUS®, which could capture the intricate joinery details of different materials such as timber, bamboo and ikra, interfacing with modern minimal elements such as masonry and concrete/RCC. Dynamic characteristics are evaluated using modal analysis so as to test the efficacy of the model. Seismic evaluation is performed using response spectrum method of IS 1893(Part 1): 2016. It has been observed that the model is safe against the seismic excitation for this region.

Keywords: Assam type building, Finite element modelling, ABAQUS®, Modal analysis, Response spectrum analysis